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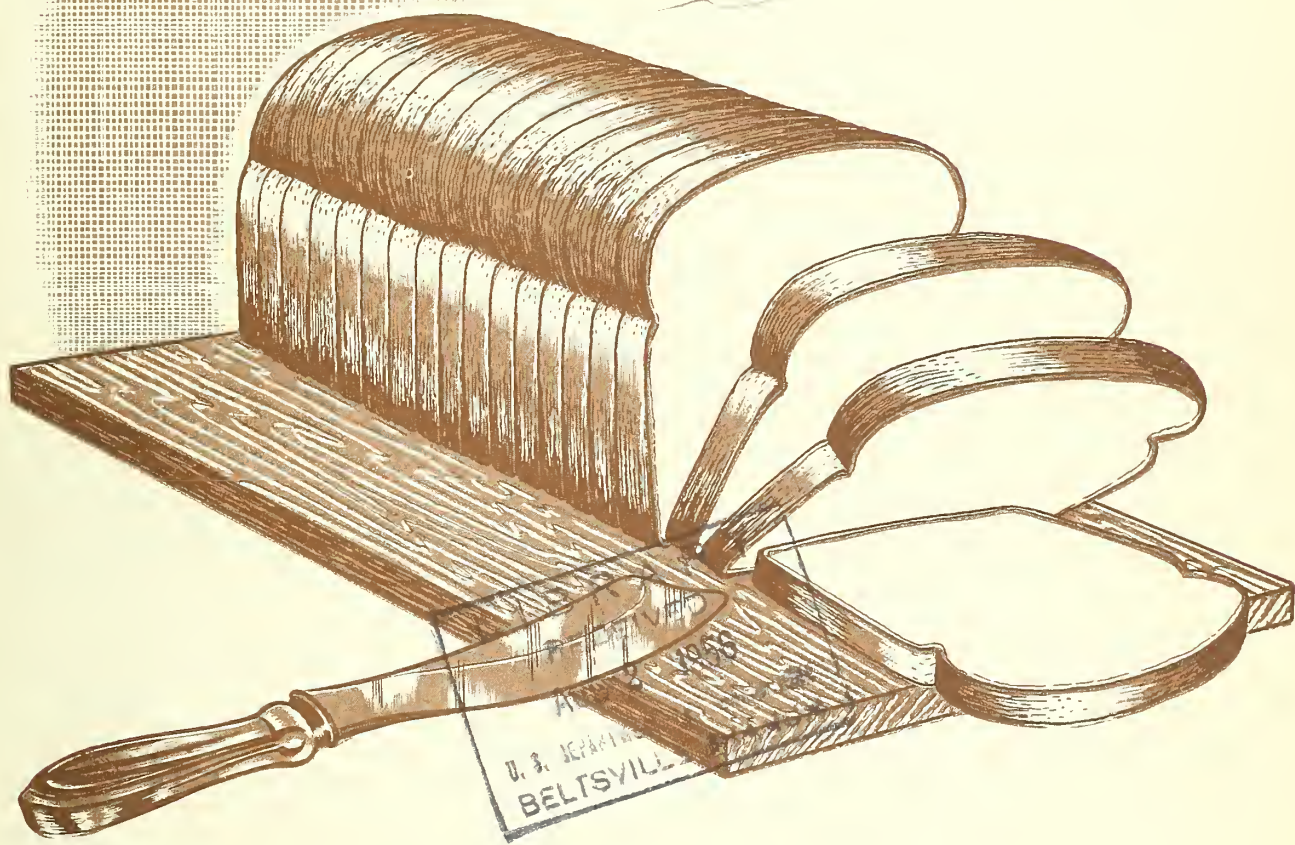
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No. 118

Consumers' preferences among

BAKERS' WHITE BREADS

of different formulas
A Survey in Rockford, Ill.



Marketing Research Report No. 118

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HIGHLIGHTS OF FINDINGS

A study of the preferences of consumers in Rockford, Ill., among white pan breads made by different formulas, resulted in the following findings:

1. Increasing the specific volume of bread from 7 to 10 cubic inches per ounce, making a lighter, fluffier bread, resulted in a significant increase in preference for the bread.

2. Increasing the sucrose content from 2 to 7 percent resulted in a significant increase in preference.

3. Inclusion of 4 percent of nonfat milk solids increased the preference for the bread significantly as compared with bread containing no milk solids; but a further increase in content to 8 percent did not have a significant effect.

4. Increasing the lard content from 3 to 5 percent did not significantly affect preferences.

5. Four of the 5 experimental breads received relatively high preference ratings, with no significant difference among these 4 breads. The fifth bread, which contained no milk solids, received a lower preference rating. The formulas of the 4 preferred breads were:

<u>Specific volume</u>	<u>Lard percentage</u>	<u>Sucrose percentage</u>	<u>Nonfat milk solids percentage</u>
10	5	7	8
10	3	7	4
10	3	7	8
10	5	7	4

The second formula shown above represents the usual commercial standard.

6. The pattern of preference for the experimental breads was not related to the socio-economic characteristics of the respondents.

In addition to the preference tests of the experimental breads, interviews were conducted with the homemakers in the participating households to determine the pattern of use of bread and the opinions about bakers' white pan bread. The interviews showed that:

1. Nearly all of the homemakers served bread at each of the three meals of the day.

2. In a sizable proportion of these households, however, there were individual family members who did not eat bread regularly.

3. Homemakers were using a variety of loaf breads (white, whole wheat, etc.), but white loaf bread was the only kind bought several times a week by a high proportion of them.

4. The key criteria used by homemakers in evaluating bakers' white pan breads were: Freshness at time of purchase and ability to retain freshness, satisfactory taste, and absence of doughy or gummy characteristics.

CONSUMERS' PREFERENCES AMONG BAKERS' WHITE BREADS

of different formulas--a survey in Rockford, Ill.

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BACKGROUND OF THE STUDY

The purpose of this research was to learn about consumer preferences among bakers' white pan breads that varied in specific volume (weight per cubic inch), percentage of lard, percentage of sucrose, and percentage of nonfat milk solids. It was believed that if marked preferences existed for particular formulations, the baking industry might apply the knowledge of such preferences in baking breads that would have greater consumer acceptance, and thus halt or reverse the downtrend in household use of bread. Also, in the light of present abundance of milk and milk products, data on the percentage of nonfat milk solids in the preferred formula might prove helpful to the dairy industry.

The immediate objective of the research reported here was to determine which of several white pan bread formulas ^{1/} had the highest preferences among household consumers in Rockford, Ill. However, in order to measure comprehensively consumer reactions and preferences for the alternative formulations, it was realized that the total project would require three stages of research:

1. Discrimination tests to determine formulations which can be distinguished from each other by consumers.
2. Preference tests among a representative sample of household consumers to determine relative preferences for selected formulations.
3. Merchandising tests of those formulations that have highest consumer preference.

This report covers the first 2 of the 3 stages. The first stage of the project was conducted during 1952 and 1953 at the American Institute of Baking in Chicago, and in Washington, D. C., and Alexandria, Va.

^{1/} Formulas for the test bread were developed by the American Institute of Baking in Chicago, Ill., and, in the case of Experiment II, in consultation with the Baking Industry Research Council. The bread was made by the sponge and dough process.

The second stage was conducted in 2 experiments in 1954 and 1955 in Rockford, Ill. Five breads were tested in the first experiment and five in the second. The preference tests were conducted in 2 representative samples of all households in Rockford, Ill. All persons 16 years of age and over in the sample households were eligible to participate in the preference tests.

In addition to the determination in stage 2 of preferences for selected white pan bread formulas, interviews were conducted among homemakers concerning their use of bread in general and their opinions about bakers' white pan bread.

SELECTION OF THE EXPERIMENTAL BREADS

The breads used in the first household experiment were selected on the basis of discrimination tests. The objective of these tests was to select a set of white breads that were mutually discriminable for "non-expert" tasters.

The experimental breads used in these tests varied in specific volume (7 and 10 cubic inches per ounce), lard (1 and 5 percent), sucrose (2 and 7 percent), and nonfat milk solids (0, 4, and 8 percent). All possible combinations of these ingredients yield 24 different formulas (appendix table 1). The formulas and procedures for baking these breads were developed by the American Institute of Baking (appendix, page 49).

The discrimination tests were conducted on two levels: (1) Preliminary tests, conducted at the American Institute of Baking to screen the breads that would be presented later to a household consumer panel; (2) final discrimination tests, conducted among a household panel of consumers to determine the set of breads that would be submitted for consumer preference tests.

Discrimination Screening Tests

The American Institute of Baking conducted a screening test of ability to distinguish between the 24 white pan breads. Students and employees at the Institute were the subjects used in this screening test. The students were men who worked in production baking and had been sent to the Institute for further study. It was felt that the breads these particular subjects could not distinguish would hardly be detected as being different by "average" consumers. On the other hand, it would not follow that "average" consumers could make all of the discriminations these students and employees could make. Therefore, the set of discriminable breads obtained in this screening test was submitted later to a consumer panel for further discrimination tests.

The procedure used to investigate ability to discriminate between any given 2 breads was the triangle test: The subject was presented with 3 samples and told that 2 were alike and 1 was different. The subject was to taste the samples and indicate the sample that was different. 2/

2/ Chi square was used to test for departures from an expected distribution of one-third correct and two-thirds incorrect identifications. All statistical tests in this study were performed at the 5 percent level of significance unless otherwise noted.

Theoretically, in an experiment designed to produce a set of mutually discriminable food items, all possible pairings of the items should be tested. With 24 breads this would have meant 276 pairings. Actually, after the first series of paired tests it developed that breads Nos. 10, 16, and 18 formed a mutually discriminable set. Each bread that had not already been eliminated was then tested against this set. In order to be added to the set, a new formula had to be distinguishable from all of the other breads in the set. When a new bread survived this criterion, the next formula had to prove distinguishable from all of the formulas already in the set. Whenever a bread was not discriminated from any other one in the set, it was eliminated from further consideration. This procedure greatly reduced the number of pairings involved in producing the final set of breads in the screening tests.

This preliminary screening test yielded 7 white pan breads -- Nos. 3, 7, 10, 13, 16, 18, and 21, in table 1 -- that were mutually discriminable for students and employees at the Institute.

Consumer Panel Discrimination Tests

The consumer panel was composed of the adult members of 48 households in a new residential area adjacent to Alexandria, Va. The area consisted of about 600 homes. Approximately every 12th household was contacted. To be eligible a household had to contain at least two adults who agreed to participate throughout the experiment. There were some tests in which fewer than the 48 households participated.

The test breads were baked by a bakery in Washington, D. C. The American Institute of Baking provided the instructions for baking the breads according to formula. The experimental breads were baked on Wednesdays and delivered to the consumer panel on Thursdays. The breads were wrapped in clear wax paper and coded for identification purposes.

The triangle test was used with the consumer panel. Each household received three loaves of bread -- two alike and one different. The homemaker was instructed to serve the bread as she normally would, but to use some of each loaf at a serving. A separate questionnaire was left for each adult, with instructions that the judgments were to be made independently. The task was to indicate which of the 3 loaves of bread was the different one. Discrimination tests were conducted weekly.

After 5 discrimination tests, a new panel of 48 households was established. This was done to offset any learning effects that might have been produced by continuing participation. This new panel participated for 6 weeks (6 tests).

The series of tests began with all pairings of breads Nos. 7, 13, and 18. These breads proved to be mutually discriminable (appendix table 2). Bread No. 21 was then tested against each of the above breads and was discriminable from each of them. This bread was, therefore, added to the set. Breads Nos. 3, 10, and 16 were then tested against the above set. None of the latter white pan breads could be distinguished from all of the breads already in the set (appendix table 2).

The set of mutually discriminable breads, based upon the consumer panel tests, thus contained breads Nos. 7, 13, 18, and 21 (appendix table 2).

Next, the first experiment was conducted to determine consumer preferences for these 4 breads. Although 4 breads had survived the discrimination tests, a fifth was added to this set. It was felt that specific volume could be a critical factor in consumer preference for white pan breads. In order to have a preference test of specific volume, per se, bread No. 25 was added to the set. Breads Nos. 21 and 25 differed only in specific volume (No. 21 had a specific volume of 7 cubic inches per ounce, and No. 25 of 10 cubic inches). The set of breads used in the first experiment had the following formulas:

<u>Bread No.</u>	<u>Specific^{3/} volume</u>	<u>Lard percentage</u>	<u>Sucrose percentage</u>	<u>Nonfat milk solids percentage</u>
7	7	1	7	0
13	7	5	2	0
18	10	5	2	8
21	7	5	7	8
25	10	5	7	8

It will be noted that breads Nos. 7, 13, and 21 above had specific volumes of 7 cubic inches per ounce. In the discrimination tests, these breads had specific volumes of 8. Preliminary research indicated that, to assure a difference of 2 cubic inches per ounce in the baking process, the range should be from 7 to 10 cubic inches per ounce, because it was difficult to control specific volume more precisely than ± 0.5 . Therefore, for the preference tests the specific volume range was from 7 to 10.

The second experiment was conducted to determine the preference position of a white pan bread representing the commercial standard in relation to the test breads, and to measure the effect that varying levels of nonfat milk solids and of lard have on preference. The set of breads used in the second experiment, therefore, had the following formulas:

<u>Bread No.</u>	<u>Specific^{3/} volume</u>	<u>Lard percentage</u>	<u>Sucrose percentage</u>	<u>Nonfat milk solids percentage</u>
1	10	5	7	8
2	10	3	7	4
3	10	3	7	0
4	10	3	7	8
5	10	5	7	4

^{3/} The specific volume varied slightly with each baking of the breads. See appendix for actual specific volume of all breads for each week.

Bread No. 1 was the most preferred bread from the first experiment and bread No. 2 represents the usual commercial standard formula. The other formulas were selected to measure the effect of varying levels of nonfat milk solids and lard.

PREFERENCES AMONG THE VARIOUS BREADS

The purpose of the Rockford experiments was to determine consumer preferences among the selected formulations of white pan breads. Each experiment was conducted among a representative sample of all households in Rockford, Ill. The first experiment was conducted in May and June of 1954, and the second in May and June of 1955.

The Sample

The universe sampled for the two experiments was all households in Rockford, Ill. Two area probability samples were drawn to yield 300 panel households in each. Preference data were obtained from all members of a household who were 16 years of age and over. In each sample, an interview was conducted with the homemaker in each panel household. The homemaker was defined as that person in the household with major responsibility for purchasing and preparing food. Of the 300 households recruited in each of the two samples for participation in the preference tests, 291 participated throughout the tests in the first experiment and 296 in the second experiment.

Experimental Design

The 300 participating households in each sample were selected 3 to a block through 100 blocks. Of these 300 households, 150 received bread on Tuesday and 150 on Wednesday of each week. Within each group, one-fifth of the households received 1 of the 5 breads each week. The tests ran for 5 consecutive weeks so that each household would have experience with all 5 breads. The sixth week each household received the same bread as it had received the first week. This replication was for the purpose of checking the reliability of the testing method. The order in which each household received the breads was randomly determined. The test breads were baked at the American Institute of Baking in Chicago on Monday and Tuesday of each week. The bread was picked up by a truck in the afternoon of the day of baking and delivered to a bakery in Rockford, Ill., for overnight storage. The bread baked on Monday was delivered to one-half of the panel households on Tuesday and the bread baked on Tuesday was delivered to the other half of the panel households on Wednesday.

The bread was delivered to the panel households wrapped in nontransparent wax paper without any markings except the identifying code.

When bread was delivered to a household, the homemaker was asked to see that each family member 16 years of age and over gave the bread a preference rating. The respondents were instructed to make their preference ratings when they first tasted or ate the bread. They were also asked to taste or eat the bread plain before making a rating. This procedure was to insure comparable testing conditions throughout the sample households.

In judging the breads, the respondents used the scale shown in figure 1. Each respondent was asked to make his ratings independently of the other members of the household. The instructions for using the scale were:

"From the 'Rating Scale' you will see that your opinion about this bread may be expressed as falling anywhere from 'Dislike Extremely' up through 'Like Extremely'. Put a cross (X) in the ONE block that expresses your opinion about this bread."

This scale is scored 1 to 10, going from the bottom to the top "blocks." As previously stated, all persons 16 years of age and over in a household gave preference ratings. From 636 to 663 people gave preference ratings for each of the breads.

RATING SCALE
Used to Measure Preferences

LIKE EXTREMELY

☐
☐
☐
☐
☐
☐
☐
☐
☐
☐

DISLIKE EXTREMELY

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Figure 1

In addition to the measure of preferences obtained by the rating scale, another measure of preference was obtained by ascertaining consumption of the breads throughout the test period. When the test breads were delivered to the households, enough bread was left so that all members of the household one year of age and over would have more than they would normally eat for a period of seven meals. The amount left at any one household was based on the number of members. The homemakers were instructed to serve and use the bread as they normally would after the eligible household members had rated the bread for preference. After the specified time period the interviewers returned to the household to pick up the completed rating scales and at that time made a count of the number of slices of bread that had been eaten. This was done by counting the slices that were still in the wrapper and subtracting from the total left originally. Any bread used for purposes other than eating was not included in the consumption figure.

Results of Preference Tests in Experiment I

The mean preference ratings for each of the five breads in Experiment I are shown in figure 2 (see also appendix table 3). All of these mean ratings were significantly different from each other with the exception of breads Nos. 7 and 13. Bread No. 25 received the highest preference rating; the lowest ratings were given to breads Nos. 7 and 13. Bread No. 25 had 10

specific volume, 5 percent lard, 7 percent sucrose, and 8 percent nonfat milk solids. The bread which was second in preference (No. 18) was identical with bread No. 25 except that the sucrose was 2 percent rather than 7 percent. Bread No. 21 was third in preference and it differed from bread No. 25 only in being at 7 specific volume rather than 10.

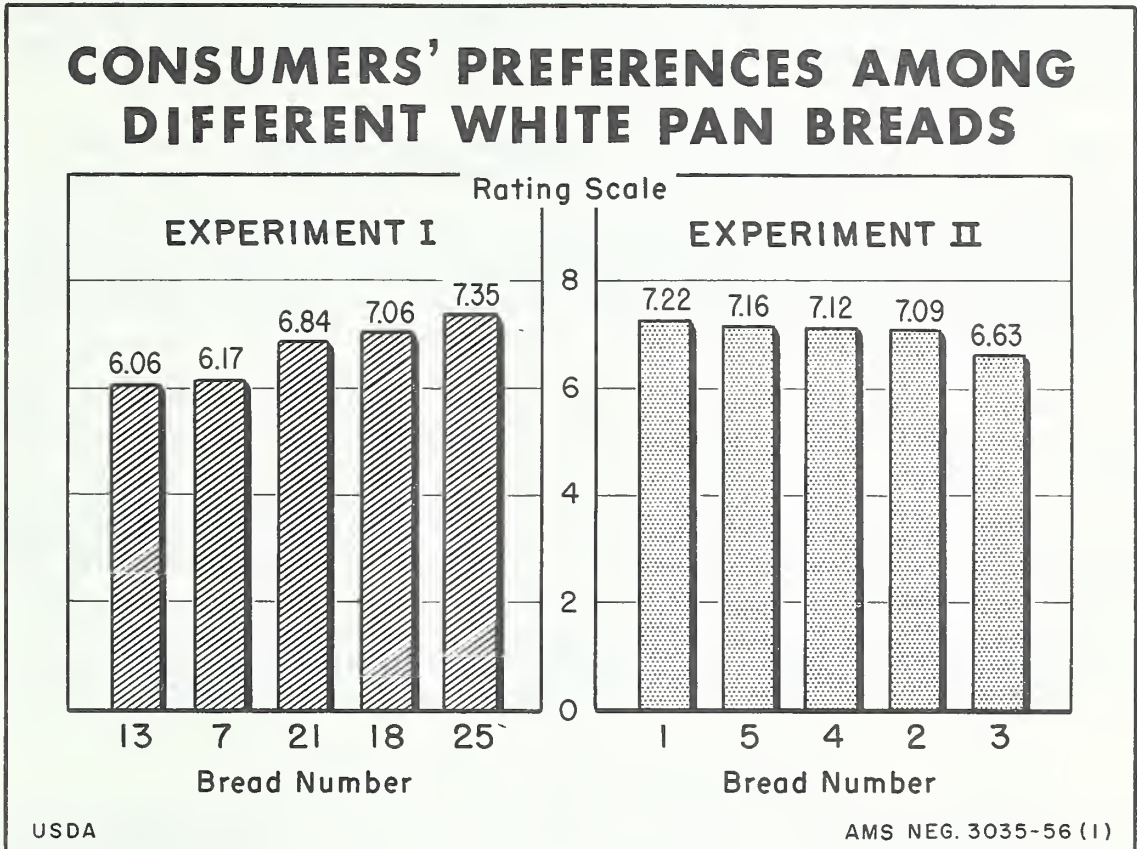


Figure 2

The three most preferred breads -- Nos. 25, 18, and 21 -- have in common comparatively high lard content (5 percent) and comparatively high milk content (8 percent nonfat milk solids). On the other hand, the two least preferred breads -- Nos. 7 and 13 -- have in common low specific volume and absence of milk.

The preference positions of breads Nos. 25, 18, and 21 relative to each other indicate the relative importance of specific volume and sucrose. Bread No. 25 with the highest preference rating, contained the highest levels of each of the four variables. Lowering the sucrose from 7 percent to 2 percent, with all other factors remaining constant, produced the bread that was second in preference -- No. 18. Keeping three factors in No. 25 constant but lowering specific volume from 10 to 7 produced the bread that was third in preference. The implication here is that lowering specific volume is more critical in preference than is lowering sucrose, in terms of the particular levels of each utilized in this research.

Results of Preference Tests in Experiment II

Preference ratings for all respondents.--The mean preference ratings for each of the five breads in experiment II are shown in figure 2 (appendix table 4). Bread No. 3 received the lowest preference rating by a significant margin. The ratings of the other 4 breads were not significantly different from each other. This set of 4 breads includes the bread (No. 1) that received the highest preference rating in the first experiment and the bread (No. 2) that represents the commercial standard.

With respect to the individual variables, the results of experiment II show that the bread (No. 2) with 4 percent nonfat milk solids was significantly preferred over the bread (No. 3) with no nonfat milk solids. The breads (Nos. 1 and 4) with 8 percent nonfat milk solids were not significantly preferred over the breads (Nos. 5 and 2) with 4 percent nonfat milk solids. Increasing the percentage of lard from 3 to 5 did not significantly increase preference as indicated by the data for breads Nos. 2 and 5.

In summary, results from the 2 experiments reveal the following major findings with respect to consumer preferences among bakers' white pan breads in Rockford, Ill.:

(1) Four of the experimental breads received relatively high preference ratings, and there were no significant differences in preference among the 4. The formulas of these 4 breads were:

<u>Specific volume</u>	<u>Lard percentage</u>	<u>Sucrose percentage</u>	<u>Nonfat milk solids percentage</u>
10	5	7	8
10	3	7	4
10	3	7	8
10	5	7	4

The formula representing the commercial standard is included in these 4 breads.

(2) The effects of varying any one variable, with all others held constant, were: (a) Increasing the specific volume from 7 to 10 cubic inches per ounce significantly increased preference; (b) increasing sucrose from 2 to 7 percent significantly increased preference; (c) increasing the nonfat milk solids from 0 to 4 percent significantly increased preference; (d) increasing the nonfat milk solids from 4 to 8 percent did not significantly increase preference; (e) increasing lard from 3 to 5 percent did not significantly increase preference.

Preferences by age, sex, and family income.--The preference ratings for the three age groups were generally the same (appendix tables 5 and 6). Although the relative position of individual breads did shift from one group to another in some cases, the overall positions of the high-preference breads and the low-preference breads tended to remain the same from one group to another.

There was no indication that the preference ratings differed between male and female respondents (appendix tables 7 and 8). The preference pattern within each group was similar to the pattern for all respondents.

Although the order of preference for the breads was generally the same for the 3 income groups, the mean preference ratings for the breads were lower in the high-income group than was true for either the middle-income or low-income groups (appendix tables 9 and 10). This would seem to indicate that the high-income group was least favorably disposed to all of the breads.

Consumption of Bread by All Households

The actual consumption of each of the breads is shown in appendix table 11. In the first experiment, the relative positions of the breads as shown by the rating scale were duplicated in the consumption data. Bread No. 25, which received the highest preference rating, showed the largest number of loaves consumed; bread No. 13, which received the lowest preference rating, showed the smallest number.

However, in the second experiment the consumption data for the 5 breads did not duplicate the preference positions of the breads. Bread No. 3, which received the lowest preference rating, showed as many loaves consumed as the more preferred breads.

Lack of correlation of the consumption data with the preference ratings in the second experiment may be explained by the fact that the breads were more nearly alike in palatability. This is demonstrated in the finding that the preference ratings for 4 of the breads were not significantly different.

Reproducibility of the Preferences

Preference ratings for each bread in the first and sixth weeks.--The experimental design for this research was such that each household received each of the 5 breads through 5 successive weeks. The sixth week, each household received the bread it had tested the first week. The respondents were not told that these two breads were identical.

In experiment I, the respective mean preference ratings for breads Nos. 7, 13, and 21 did not change significantly in the sixth week from what they had been in the first week. Breads Nos. 18 and 25, however, received significantly higher preference ratings in the sixth week than in the first week (appendix table 12). The conclusion to be drawn here is that, after the first week, experience with the other breads through the remaining 4-week test period influenced opinion about these 2 breads so as to elevate preferences for them. Apparently, the final preference positions of breads Nos. 18 and 25 depended, to some extent, upon having knowledge of the other breads in the set. It will be noted that the preference order of the breads for the sixth week duplicates that obtained when the analysis was based upon all judgments, regardless of weeks (appendix table 12).

Although the prolonged experience with all the breads affected the preference ratings for 2 of the breads from the first to the sixth week, there was a certain consistency in preference pattern in the 2 periods. In each of these weeks, breads Nos. 25, 18, and 21 represented a relatively high-preference set; breads Nos. 7 and 13 represented a relatively low-preference set.

In experiment II, ability to reproduce the ratings for all of the breads was not as marked as in Experiment I. However, the general pattern was the same, the least preferred bread (No. 3) ranking low for all the weeks; while the rank order of the other 4 breads shifted. This would be expected, since there were no significant differences in their ratings.

The same bread in two experiments.--It will be recalled that one of the breads was rated in both experiments (No. 25 was the same bread as No. 1). It was rated by one sample of households in experiment I in 1954 and by another independent sample in experiment II in 1955. The mean ratings for the bread were 7.35 and 7.22 in the first and second experiments, respectively. This difference was not significant.

Interviews with Homemakers

Interviews were held in 1954 and 1955 with homemakers who took part in the study. It will be recalled that each sample was composed of 300 households. The results for the 2 years are reported separately in the appendix tables. There is a high degree of agreement in the interview data; most of the differences between the 2 years are less than would be expected from sampling error.

General use of bread.--All of the homemakers interviewed reported serving bread in their homes. Except for 1 home in each group, bread was served daily. Nearly all of the homemakers served bread at each of the 3 meals of the day. More than half of the homemakers used bread in packed lunches, and about half of them served it in between-meal snacks (appendix table 13). The income of the family did not appear to be related to whether or not bread was usually served at the various times of the day (appendix table 14).

Homemakers who did not usually serve bread for breakfast or dinner gave as their main reason that of not liking bread with their meals because they preferred other foods. A few gave reducing and avoiding weight as reasons for not usually serving bread for breakfast or dinner.

Serving of bread at breakfast was not significantly related to the number of people in a household. In contrast, it was the larger families which were more likely to be served bread at noon meals and dinner, in packed lunches and in between-meal snacks. It was in the last two uses that the difference between small and large families was most marked (appendix table 15).

In general, the education of the homemaker did not seem to be related to the serving of bread at the various meals (appendix table 16).

Although all of the homemakers reported serving bread, about 25 percent reported having some family members who sometimes did not eat the bread (appendix table 17). The majority of those not eating bread when it was served were female members of the family (appendix table 18). Those not eating bread when it was served were usually over 20 years old (appendix table 19). Attempts to reduce and avoidance of added weight were important reasons given for not eating bread when it was served. Other reasons were preference for other foods and the habit of eating bread only at certain meals (appendix table 20).

Kinds of loaf bread bought.--The homemakers were using a variety of loaf breads. More than 95 percent of the homemakers reported buying white loaf bread. About 50 percent bought whole wheat and about the same proportion bought rye bread, while smaller proportions reported buying French or Vienna bread, raisin bread, and miscellaneous other kinds of loaf breads (appendix table 21).

Family income and the number of people in the household did not appear to be factors in the particular kind of loaf bread bought (appendix tables 22 and 23).

Education of the homemaker was not related to the proportion of households buying a particular kind of loaf bread (appendix table 24).

Place of purchase of loaf bread.--It was felt that if there was dissatisfaction among consumers with the kind of white loaf bread available in grocery stores, one way by which consumers would show this dissatisfaction would be by buying their loaf bread at bakeries or some other places than the grocery store. The extent of purchases of loaf bread at places other than grocery stores is shown in appendix table 25. A relatively high proportion of homemakers bought their loaf bread from the grocery stores. About 1 in 5 bought white loaf bread at bakeries. The main reason given for not buying white loaf bread at the grocery store was that the bread was doughy, gummy, and not well baked, while a smaller number mentioned preferring the taste of bakers' bread (appendix table 26).

Frequency of purchases and amount of loaf bread bought per week.--White loaf bread was the only kind of bread bought more than once a week by a high proportion of homemakers. Three in 4 homemakers bought white loaf bread several times a week. The other loaf breads were bought by most homemakers once a week or less often (appendix table 27).

The number of loaves of white bread bought per week was substantially higher than that of the other kinds of bread. About two-thirds of the homemakers bought 3 or more loaves of white bread per week, while about the same proportion reported buying only 1 loaf of the other kinds of bread per week (appendix table 28).

Households in the middle-income and high-income groups bought a greater number of loaves of white bread per week than households in the low-income group (appendix table 29).

Kinds of white loaf bread bought.--The extent to which homemakers used the smaller, more compact specialty white loaf breads could be an indication of their dissatisfaction with the present commercial loaf of white bread. Of the homemakers who were buying white loaf bread at the grocery store or delicatessen, only 6 percent bought the specialty loaves, and about half of the latter bought both the specialty and regular bread. As a possible reason for only 6 percent trying specialty loaves, it must also be pointed out that the specialty loaves are more expensive breads than the white pan breads. The main reasons given by homemakers for buying the specialty white loaf were that it is well-baked and not gummy or doughy, is compact, is filling, and has better taste. At the same time, these particular homemakers said they did not buy the regular white loaf bread because it was doughy, gummy, not well-baked, not compact, not filling, and not good-tasting.

What homemakers like and dislike about white loaf breads now available.—Those homemakers who did buy the regular white loaf bread at the grocery store or delicatessen or by home delivery were asked to tell the things they liked and disliked about this bread. The two characteristics mentioned by the highest proportion of homemakers as being liked were: The bread was fresh and stayed fresh, and it was good for toast (appendix table 30). On the other hand, the disliked characteristics mentioned by the highest proportion of homemakers were: The bread was doughy, gummy, and not well-baked; the bread was too light, too full of air holes and did not have substantial texture; and the bread did not have a good taste (appendix table 31).

Homemakers' descriptions of available white loaf bread and its desirable and undesirable characteristics.--The "likes" and "dislikes" cited in the prior section, and shown in appendix tables 30 and 31, were expressed by homemakers in answer to the general question, "What are some of the things you like (dislike) about the regular kind of white loaf bread?"

In order to provide maximum opportunity for description of this bread in all pertinent aspects, a list of 36 characteristics, positive and negative, was presented to each respondent (appendix, p. 48). The respondent selected as many items as she thought described white loaf bread. When she had completed this she was asked to indicate the particular 3 items in her selection which best described the product. Analysis of these responses was based upon those items selected as being the 3 most descriptive by at least 10 percent of the respondents.

Next, using the same list, the homemakers were asked to select the 5 items that they "would consider the most important in a really good loaf of white bread." Then they were asked to indicate the 5 characteristics they "would dislike most in a loaf of white bread." In each of these instances, the analysis of the data was again based upon the items selected by at least 10 percent of the homemakers.

The results of the questions are presented in appendix table 32. Only 2 items were selected by fairly substantial proportions of homemakers as being descriptive of the white loaf bread now available -- it keeps fresh and it is good for toast (42 percent and 31 percent, respectively). The other items were chosen by 20 percent of the homemakers or less. This low level of

response, especially when selecting from a list of characteristics, can be interpreted as revealing that the homemakers did not have a uniform or consistent concept of the white loaf bread being sold in grocery stores.

The characteristics chosen as being most important in a "really good loaf of white bread" were: (1) Keeps fresh, and (2) homemade taste, selected by 58 and 48 percent, respectively. Other items selected by sizable proportions were: Nourishing, good for toast, good taste, fine texture, light, and easily digested.

As for the characteristics that would be most disliked in white loaf bread, about 60 percent of the homemakers selected "doughy" and "tasteless" or "flat taste." About half of the homemakers indicated each of the following items: Not well-baked, and gets stale quickly.

A comparison of the opinions about characteristics gives some indication of how the currently available white loaf bread measures up to what homemakers think is desirable and undesirable in this product. First, the higher proportions tending to select certain characteristics as being most important or most disliked indicate that there is more of a consensus about what the consumers like and dislike than about characteristics of the bread now being sold. Second, most homemakers said that freshness was an important characteristic of a good loaf of white bread and most of them said that the bread now being sold keeps fresh. In contrast, the list of desirable and undesirable characteristics shows that taste factors are very important but only about 15 percent of the homemakers said that the bread now being sold had a good taste.

In summary, homemakers evaluate bakers' white pan bread primarily in terms of the following criteria: Its freshness at time of purchase and ability to remain fresh, satisfactoriness of its taste, and absence of doughy or gummy characteristics (appendix tables 30, 31, and 32).

Incidence and frequency of baking bread.--More than half of the homemakers baked bread, such as loaf bread, rolls, biscuits, muffins, or cornbread. Of those who baked bread, about 1 in 3 baked it once a week or more (appendix tables 33 and 34). There were no significant differences among income groups in either the baking of bread or the frequency of baking (appendix tables 35 and 36). The education of the homemakers was not related to the incidence or frequency of baking bread (appendix tables 37 and 38). As might be expected, those households with the highest number of members contained the highest proportion of homemakers baking as well as the highest frequency of baking (appendix tables 39 and 40).

Changes in amount of white loaf bread used.--Of those homemakers who reported changes in the amount of white loaf bread used the year prior to the interviews, the number who said they used more was about twice as large as the number who said they used less. However, 6 in 10 reported using the same amount (appendix table 41). The main reasons given for changing, either more or less, were associated with changes in the family rather than with the bread itself. Some reasons were that children were eating more bread as they got older, more (or fewer) packed lunches were being prepared, and family size had increased or decreased (appendix tables 42 and 43). Those homemakers

who reported using less white loaf bread were asked what kind of bread they used in place of it. The highest proportion of these homemakers said no other bread was used and the remainder reported a variety of dark breads (appendix table 44).

The questions concerning changes in the amount of white loaf bread used were designed to determine whether or not the characteristics of the bread were responsible for changes. Apparently those changes that did occur were brought about by factors other than characteristics of the bread. No mention of the bread itself was made as a reason for changing.

The pattern of change and the reason for changing the amount of all types of bread used were not different from those found for white loaf bread alone (appendix tables 45, 46, and 47).

APPENDIX

Tables

Table 1.--The experimental set of white pan breads used in laboratory discrimination tests

Bread No.	Specific volume (cu.in.oz.)	Lard percentage	Sucrose percentage	Nonfat milk solids percentage
1	8	1	2	0
2	8	1	2	4
3	8	1	2	8
4	10	1	2	0
5	10	1	2	4
6	10	1	2	8
7	8	1	7	0
8	8	1	7	4
9	8	1	7	8
10	10	1	7	0
11	10	1	7	4
12	10	1	7	8
13	8	5	2	0
14	8	5	2	4
15	8	5	2	8
16	10	5	2	0
17	10	5	2	4
18	10	5	2	8
19	8	5	7	0
20	8	5	7	4
21	8	5	7	8
22	10	5	7	0
23	10	5	7	4
24	10	5	7	8

Table 2.--Results of discrimination tests of white pan breads--consumer panel

Formula	Specific volume (cu.in. per oz.)	Lard percent-age	Sucrose percent-age	Nonfat milk solids percent-age	Formula	Specific volume (cu.in. per oz.)	Lard percent-age	Sucrose percent-age	Nonfat milk solids percent-age	R E S U L T S		
										No. of correct judgments	No. of incorrect judgments	Total judgments
7	8	1	7	0	18	10	5	2	8	1/ 29	23	52
7	8	1	7	0	13	8	5	2	0	1/ 34	18	52
18	10	5	2	8	13	8	5	2	0	1/ 29	18	47
18	10	5	2	8	21	8	5	7	8	1/ 52	48	100
7	8	1	7	0	21	8	5	7	8	1/ 56	46	102
13	8	5	2	0	21	8	5	7	8	1/ 74	22	96
18	10	5	2	8	3	8	1	2	8	1/ 45	49	94
13	8	5	2	0	3	8	1	2	8	1/ 47	46	93
7	8	1	7	0	3	8	1	2	8	2/ 32	61	93
7	8	1	7	0	10	10	1	7	0	2/ 32	59	91
13	8	5	2	0	16	10	5	2	0	2/ 30	62	92

Set of mutually discriminable breads: Formulas 7, 13, 18, 21.

1/ P less than 0.01.
2/ P more than 0.05.

Table 3.--Preference ratings for five white pan breads 1/ - Experiment I

Mean and standard deviation	Bread No. 7	Bread No. 13	Bread No. 18	Bread No. 21	Bread No. 25
Mean -----	6.17	6.06	7.06	6.84	7.35
Standard deviation -----	2.84	2.80	2.50	2.55	2.37
Number of people ---	663	655	653	652	649

<u>1/</u>	<u>Bread No.</u>	<u>Specific volume</u>	<u>Lard percentage</u>	<u>Sucrose percentage</u>	<u>Nonfat milk solids percentage</u>
	7	7	1	7	0
	13	7	5	2	0
	18	10	5	2	8
	21	7	5	7	8
	25	10	5	7	8

Table 4.--Preference ratings for five white pan breads 1/ - Experiment II

Mean and standard deviation	Bread No. 1	Bread No. 2	Bread No. 3	Bread No. 4	Bread No. 5
Mean -----	7.22	7.09	6.63	7.12	7.16
Standard deviation -----	2.27	2.34	2.50	2.46	2.32
Number of people ---	647	636	647	653	646

<u>1/</u>	<u>Bread No.</u>	<u>Specific volume</u>	<u>Lard percentage</u>	<u>Sucrose percentage</u>	<u>Nonfat milk solids percentage</u>
	1	10	5	7	8
	2	10	3	7	4
	3	10	3	7	0
	4	10	3	7	8
	5	10	5	7	4

Table 5.--Preference ratings for five white pan breads by age of respondent--Experiment I

Bread No. <u>1/</u>	Age of respondent								
	16 - 20 years			21 - 34 years			35 years and over		
	Mean	Standard deviation	Number of people	Mean	Standard deviation	Number of people	Mean	Standard deviation	Number of people
7	5.62	3.01	45	5.96	2.78	209	6.35	2.84	409
13	6.77	2.76	43	5.80	2.74	209	6.12	2.82	403
18	7.02	2.60	45	7.71	2.17	202	6.88	2.64	406
21	6.71	2.76	45	6.69	2.46	205	6.94	2.57	402
25	7.53	2.45	43	7.27	2.22	206	7.37	2.45	400

1/ For formulas see table 3.

Table 6.--Preference ratings for five white pan breads by age of respondent--Experiment II

Bread No. <u>1/</u>	Age of respondent								
	16 - 20 years			21 - 34 years			35 years and over		
	Mean	Standard deviation	Number of people	Mean	Standard deviation	Number of people	Mean	Standard deviation	Number of people
1	7.35	2.37	43	7.17	2.12	212	7.23	2.34	391
2	7.37	2.33	43	6.90	2.36	209	7.15	2.33	382
3	6.54	2.41	41	6.75	2.19	216	6.56	2.67	388
4	7.51	2.22	45	7.32	2.33	211	6.97	2.55	395
5	8.19	1.75	43	7.28	2.03	213	6.99	2.49	388

1/ For formulas see table 4.

Table 7.--Preference ratings for five white pan breads by sex of respondent--
Experiment I

Bread No. <u>1</u> /	Sex of respondents					
	Male			Female		
	Mean	Standard deviation	Number of people	Mean	Standard deviation	Number of people
7	6.18	2.82	300	6.17	2.86	361
13	6.14	2.71	295	6.01	2.87	358
18	7.09	2.46	298	7.02	2.55	354
21	6.78	2.49	294	6.83	2.59	357
25	7.29	2.42	297	7.40	2.33	351

1/ For formulas see table 3.

Table 8.--Preference ratings for five white pan breads by sex of respondent--
Experiment II

Bread No. <u>1</u> /	Sex of respondents					
	Male			Female		
	Mean	Standard deviation	Number of people	Mean	Standard deviation	Number of people
1	7.19	2.22	305	7.24	2.31	342
2	7.00	2.42	304	7.17	2.26	332
3	6.69	2.47	306	6.59	2.51	340
4	7.06	2.54	314	7.18	2.39	339
5	7.12	2.28	303	7.20	2.36	343

1/ For formulas see table 4.

Table 9.--Preference ratings for five white pan breads by family income -- Experiment I

Bread No. <u>1</u> /	Family income								
	Low (Less than \$4,400)			Middle (\$4,401 - \$6,570)			High (\$6,571 and over)		
	Mean	Standard deviation	Number of people	Mean	Standard deviation	Number of people	Mean	Standard deviation	Number of people
7 -----	6.46	2.85	169	6.22	2.85	182	5.78	2.74	215
13 -----	6.38	2.86	166	5.24	2.79	178	6.18	2.63	217
18 -----	7.58	2.43	163	7.19	2.39	176	6.50	2.58	219
21 -----	6.87	2.70	165	6.86	2.49	175	6.54	2.42	219
25 -----	7.52	2.51	171	7.53	1.93	180	6.98	2.57	213

1/ For formulas see table 3.

Table 10.--Preference ratings for five white pan breads by family income -- Experiment II

Bread No. <u>1</u> /	Family income								
	Low (Less than \$4,680)			Middle (\$4,681 - \$6,817)			High (\$6,918 and over)		
	Mean	Standard deviation	Number of people	Mean	Standard deviation	Number of people	Mean	Standard deviation	Number of people
1 -----	7.45	2.22	178	7.50	2.19	169	6.74	2.33	224
2 -----	7.41	2.09	172	7.20	2.15	167	6.76	2.60	229
3 -----	6.73	2.57	177	6.80	2.41	169	6.53	2.35	223
4 -----	7.07	2.52	180	7.05	2.49	169	7.14	2.36	225
5 -----	7.21	2.41	175	7.36	1.89	172	6.76	2.53	223

1/ For formulas see table 4.

Table 11.--Actual consumption of white pan breads -- Experiments I and II

Bread No. <u>1</u> /	Total number of slices consumed	Total number of loaves consumed <u>2</u> /	Number of households
7	7,165	377.00	291
13	7,074	372.31	291
18	7,591	399.53	291
21	7,455	392.37	291
25	7,627	401.42	291
1	8,684	457.05	296
2	8,740	460.00	296
3	8,670	456.32	296
4	8,742	460.10	296
5	8,847	465.63	296

1/ For formulas see tables 3 and 4.

2/ Based on 19 slices per loaf.

Table 12.--Preference ratings for five white pan breads for first week and sixth week -- 1/
Experiment I

Mean and standard deviation	Bread No. 7 <u>2/</u>		Bread No. 13 <u>2/</u>		Bread No. 18 <u>2/</u>		Bread No. 21 <u>2/</u>		Bread No. 25 <u>2/</u>	
	Week 1	Week 6	Week 1	Week 6	Week 1	Week 6	Week 1	Week 6	Week 1	Week 6
Mean -----	5.83	5.91	5.96	5.90	6.85	7.95	7.01	6.95	7.05	7.97
SD -----	2.51	2.58	3.05	3.39	2.76	2.10	2.39	2.55	2.55	2.17
t <u>3/</u> -----	0.44 (P > .05)		0.22 (P > .05)		5.14 (P < .01)		0.14 (P > .05)		4.00 (P < .01)	
Number of people -----	130		118		149		115		130	

1/ Individuals had the same bread the sixth week as the first week.

2/ For formulas see table 3.

3/ Based on mean of individual differences for the 2 weeks.

Table 13.--Proportion of homemakers usually serving bread for breakfast, dinner, noon meals, packed lunches, and between-meal snacks

Serving	Breakfast		Dinner		Noon meals		Packed lunches		Between meal snacks	
	1954	1955	1954	1955	1954	1955	1954	1955	1954	1955
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Usually serves bread for -----	97	94	87	83	92	82	54	65	50	46
Does not usually serve bread for -----	3	6	13	17	8	17	46	35	50	54
Not ascertained	--	--	--	--	--	1	--	--	--	--
Total ---	100	100	100	100	100	100	100	100	100	100
Number of homemakers -	300	300	300	300	300	300	300	300	300	300

Table 14.--Proportion of homemakers usually serving bread for breakfast, dinner, noon meals, packed lunches, and between-meal snacks, by family income

1954 ^{1/}

Serving	Breakfast			Dinner			Noon meals			Packed lunches			Between meal snacks		
	Low	Middle	High	Low	Middle	High	Low	Middle	High	Low	Middle	High	Low	Middle	High
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Usually serves -----	98	99	93	91	90	84	97	92	88	50	67	56	47	55	50
Does not usually serve -----	2	1	7	9	10	16	3	8	12	50	33	44	53	45	50
Total ---	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Number of homemakers	89	93	91	89	93	91	89	93	91	89	93	91	89	93	91

- 24 -

1955 ^{2/}

Usually serves -----	91	98	93	85	82	80	84	82	79	62	76	62	40	52	52
Does not usually serve -----	9	2	7	15	18	20	15	18	20	38	24	38	60	47	48
Not ascertained -----	--	--	--	--	--	--	1	--	1	--	--	--	--	1	--
Total ---	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Number of homemakers	93	83	87	93	83	87	93	83	87	93	83	87	93	83	87

^{1/} See table 9 for tercile ranges.
^{2/} See table 10 for tercile ranges.

Table 15.--Proportion of homemakers usually serving bread for breakfast, dinner, noon meals, packed lunches, and between-meal snacks, by number of members in household

1954

Serving	Breakfast			Dinner			Noon meals			Packed lunches			Between-meal snacks		
	1 or 2	3 or 4	5 or more	1 or 2	3 or 4	5 or more	1 or 2	3 or 4	5 or more	1 or 2	3 or 4	5 or more	1 or 2	3 or 4	5 or more
	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent
Usually serves -----	95	96	100	83	87	94	87	94	97	46	55	66	31	52	74
Does not usually serve -	5	4	--	17	13	6	13	6	3	54	45	34	69	48	26
Total ----	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Number of homemakers -	101	131	68	101	131	68	101	131	68	101	131	68	101	131	68

1955

Usually serves -----	93	94	97	81	81	89	67	87	94	48	70	79	21	48	72
Does not usually serve -	7	6	3	19	19	11	31	13	6	52	30	21	79	51	28
Not ascertained -	--	--	--	--	--	--	2	--	--	--	--	--	--	1	--
Total ----	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Number of homemakers -	94	134	72	94	134	72	94	134	72	94	134	72	94	134	72

Table 16.--Proportion of homemakers usually serving bread for breakfast, dinner, noon meals, packed lunches, and between-meal snacks, by education of homemaker
1954

Serving	Breakfast			Dinner			Noon meals			Packed lunches			Between-meal snacks		
	None or grammar school	High school	College	None or grammar school	High school	College	None or grammar school	High school	College	None or grammar school	High school	College	None or grammar school	High school	College
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Usually serves	98	96	98	87	87	87	95	92	89	58	56	45	50	52	43
Does not usually serve	2	4	2	13	13	13	5	8	11	42	44	55	50	48	57
Total -----	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Number of homemakers	79	167	53	79	167	53	79	167	53	79	167	53	79	167	53
1955															
Usually serves	89	96	98	87	88	56	80	85	81	66	66	56	43	47	47
Does not usually serve	11	4	2	13	12	44	20	14	19	34	34	44	57	52	53
Not ascertained	--	--	--	--	--	--	--	1	--	--	--	--	--	1	--
Total -----	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Number of homemakers	76	169	43	76	169	43	76	169	43	76	169	43	76	169	43

Table 17.--Proportion of families having members who sometimes do not eat bread when served

Classification of families by bread-eating habits	All families	
	1954	1955
	<u>Percent</u>	<u>Percent</u>
All members eat bread when served --	76	65
Some members do not eat bread when served -----	22	32
Not ascertained -----	2	3
Total -----	100	100
Number of families -----	300	300

Table 18.--Sex of family members who sometimes do not eat bread when served

Sex	Sometimes do not eat bread when served	
	1954	1955
	<u>Percent</u>	<u>Percent</u>
Male -----	39	23
Female -----	61	77
Total -----	100	100
Number of people -----	75	109

Table 19.--Age of family members who sometimes do not eat bread when served

Age	Sometimes do not eat bread when served	
	1954	1955
	<u>Percent</u>	<u>Percent</u>
Under 12 years -----	16	10
12 - 20 years -----	8	9
Over 20 years -----	76	81
Total -----	100	100
Number of people -----	75	109

Table 20.--Reasons given for family members who sometimes do not eat bread when served

Reasons	Male		Female	
	1954	1955	1954	1955
	<u>Percent</u>	<u>Percent</u>	<u>Percent</u> ^{1/}	<u>Percent</u> ^{1/}
Reducing; avoiding weight, dieting; (avoiding starch, calories) -----	21	24	30	40
Ailments other than excess weight -----	10	12	9	10
Does not like bread with meals; prefers foods other than bread with meals -----	31	44	23	32
Only eat bread at certain meals -----	21	4	17	6
Does not like taste of white pan bread -----	3	--	--	--
Just doesn't like bread ----	7	12	17	7
Miscellaneous other reasons	--	4	2	6
Not ascertained -----	7	--	9	1
Total -----	100	100	--	--
Number of family members -----	29	25	46	84

^{1/} Percentages add to more than 100 because more than 1 reason was given for some family members.

Table 21.--Kinds of bread homemakers reported buying

Buying habits	Kinds of loaf bread											
	White loaf bread		French or Vienna		Whole wheat		Rye		Raisin		Other ^{1/}	
	1954	1955	1954	1955	1954	1955	1954	1955	1954	1955	1954	1955
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Buying -----	97	96	46	36	61	54	58	47	32	32	18	20
Not buying -----	3	4	54	63	39	46	42	53	68	67	82	80
Not ascertained -----	--	--	--	1	--	--	--	--	--	1	--	--
Total -----	100	100	100	100	100	100	100	100	100	100	100	100
Number of home-makers -----	300	300	300	300	300	300	300	300	300	300	300	300

^{1/} Other breads reported include Hollywood bread, pumpernickel, nut bread, cracked wheat, etc.

Table 22.--Kinds of loaf bread homemakers reported buying, by family income

1954 1/

Buying habits	White loaf bread			French or Vienna			Whole wheat			Rye			Raisin		
	Low	Middle	High	Low	Middle	High	Low	Middle	High	Low	Middle	High	Low	Middle	High
	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent
Buying -----	99	99	92	39	45	53	58	61	63	58	58	58	29	32	35
Not buying -----	1	1	8	61	55	47	42	39	37	39	42	42	71	68	65
Total -----	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Number of homemakers -	89	93	91	89	93	91	89	93	91	89	93	91	89	93	91

1955 2/

Buying habits	White loaf bread			French or Vienna			Whole wheat			Rye			Raisin		
	Low	Middle	High	Low	Middle	High	Low	Middle	High	Low	Middle	High	Low	Middle	High
	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent
Buying -----	97	95	98	34	45	33	53	53	53	42	48	51	29	33	33
Not buying -----	3	5	2	66	53	67	46	46	47	58	52	49	71	67	65
Not ascertained -	--	--	--	--	2	--	1	1	--	--	--	--	--	--	2
Total -----	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Number of homemakers -	93	83	87	93	83	87	93	83	87	93	83	87	93	83	87

1/ See table 9 for tercile ranges.
2/ See table 10 for tercile ranges.

Table 23.--Kinds of loaf bread homemakers reported buying, by number of members in household

1954

Buying habits	White loaf bread			French or Vienna			Whole wheat			Rye			Raisin		
	1 or 2	3 or 4	5 or more	1 or 2	3 or 4	5 or more	1 or 2	3 or 4	5 or more	1 or 2	3 or 4	5 or more	1 or 2	3 or 4	5 or more
	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent
Buying -----	93	98	99	43	47	51	62	59	65	56	56	65	37	26	38
Not buying -----	7	2	1	57	53	49	38	41	35	44	44	35	63	74	62
Total ----	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Number of homemakers	101	131	68	101	131	68	101	131	68	101	131	68	101	131	68

1955

Buying habits	White loaf bread			French or Vienna			Whole wheat			Rye			Raisin		
	1 or 2	3 or 4	5 or more	1 or 2	3 or 4	5 or more	1 or 2	3 or 4	5 or more	1 or 2	3 or 4	5 or more	1 or 2	3 or 4	5 or more
	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent
Buying -----	93	97	100	26	44	36	52	55	53	47	48	44	31	36	25
Not buying -----	7	3	--	73	55	63	48	43	47	53	52	56	69	63	72
Not ascertained	--	--	--	1	1	1	--	2	--	--	--	--	--	1	3
Total ----	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Number of homemakers	94	134	72	94	134	72	94	134	72	94	134	72	94	134	72

Table 24.--Kinds of loaf bread homemakers reported buying, by education of homemakers
1954

Buying habits	White loaf bread			French or Vienna			Whole wheat			Rye			Raisin		
	None or grammar school	High school	College	None or grammar school	High school	College	None or grammar school	High school	College	None or grammar school	High school	College	None or grammar school	High school	College
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Buying -----	97	96	96	44	44	55	63	57	70	57	57	64	35	37	43
Not buying ----	3	4	4	56	56	45	37	43	30	43	43	36	65	63	57
Total ----	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Number of homemakers	79	167	53	79	167	53	79	167	53	79	167	53	79	167	53

1955

Buying habits	White loaf bread			French or Vienna			Whole wheat			Rye			Raisin		
	None or grammar school	High school	College	None or grammar school	High school	College	None or grammar school	High school	College	None or grammar school	High school	College	None or grammar school	High school	College
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Buying -----	95	96	100	31	39	35	42	54	72	43	47	53	21	36	33
Not buying ----	5	4	--	66	61	63	57	45	28	57	53	47	79	63	65
Not ascertained	--	--	--	3	--	2	1	1	--	--	--	--	--	1	2
Total ----	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Number of homemakers	76	169	43	76	169	43	76	169	43	76	169	43	76	169	43

Table 25.---Place of purchase reported by homemakers who usually buy loaf bread

Place of purchase	Kinds of bread											
	White loaf bread		French or Vienna		Whole wheat		Rye		Raisin		Other	
	1954	1955	1954	1955	1954	1955	1954	1955	1954	1955	1954	1955
Grocery store or delicatessen -----	Percent ^{1/}	Percent ^{1/}	Percent ^{1/}	Percent ^{1/}	Percent ^{1/}	Percent ^{1/}	Percent ^{1/}	Percent ^{1/}	Percent ^{1/}	Percent ^{1/}	Percent ^{1/}	Percent ^{1/}
	85	87	73	74	80	82	66	71	80	84	48	68
	10	10	1	2	8	8	5	6	3	2	7	8
	24	18	30	20	14	7	31	21	16	10	39	17
Bakery -----	--	--	--	7	2	5	2	6	5	8	9	8
Not ascertained --												
Number of homemakers --	290	289	139	112	184	163	175	140	97	98	54	60

^{1/} Percentages add to more than 100 because some homemakers bought at more than 1 place.

Table 26.--Reasons given by homemakers for not buying white loaf bread from the grocery store, delicatessen, or by home delivery

Reasons	Homemakers not buying white loaf bread at grocery store, delicatessen, or by home delivery	
	1954	1955
	<u>Percent</u> ^{1/}	<u>Percent</u> ^{1/}
Bread doughy, gummy, soggy, not well baked -----	32	42
Bakery bread has homemade taste --	14	21
Bakery close to home or grocery store (convenience)-----	14	11
Prefer taste of bakery bread, has good taste, etc. -----	11	21
Bakery bread nourishing, wholesome, good for you, etc. -----	11	21
Miscellaneous other reasons -----	18	47
Not ascertained -----	21	16
Number of homemakers -----	28	19

^{1/} Percentages add to more than 100 because some homemakers gave more than 1 reason.

Table 28.--Number of loaves bought per week by homemakers who reported buying loaf bread one or more times per week

Loaves bought	Kinds of bread									
	White loaf bread		French or Vienna		Whole wheat		Rye		Raisin	
	1954	1955	1954	1955	1954	1955	1954	1955	1954	1955
One -----	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
	14	11	67	61	57	58	71	58	67	52
Two -----	21	22	17	13	25	24	15	24	17	38
Three -----	20	17	7	6	10	7	11	11	5	3
Four -----	13	12	2	2	2	4	2	2	--	--
Five or more ----	32	37	7	8	5	3	--	4	--	--
Not ascertained	--	1	--	10	1	4	1	1	11	7
Total ----	100	100	100	100	100	100	100	100	100	100
Number of homemakers	283	276	60	51	108	111	72	71	18	29

Table 29.--Number of loaves of white bread bought per week by homemakers who reported buying one or more times per week, by family income

Loaves bought	Low		Middle		High	
	1954 <u>1/</u>	1955 <u>2/</u>	1954 <u>1/</u>	1955 <u>2/</u>	1954 <u>1/</u>	1955 <u>2/</u>
	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
One -----	16	13	12	4	16	12
Two -----	24	24	15	20	16	20
Three -----	26	24	18	11	12	15
Four -----	12	12	17	15	15	13
Five or more -----	22	27	37	47	41	40
Not ascertained ----	--	--	1	3	--	--
Total -----	100	100	100	100	100	100
Number of homemakers ---	85	84	91	79	81	82

1/ See table 9 for tercile ranges.

2/ See table 10 for tercile ranges.

Table 30.--Characteristics liked about regular white loaf bread reported by homemakers who buy it at grocery stores, delicatessens, or by home delivery

Characteristics liked	Homemakers who buy at grocery stores, delicatessens or by home delivery	
	1954	1955
	<u>Percent</u> ^{1/}	<u>Percent</u> ^{1/}
Freshness; buy fresh and stays fresh; doesn't get stale; moist; stays moist -----	44	40
Good for toast -----	31	36
Nice (good) taste; good flavor; better flavor -----	24	26
Firm texture; good texture; nice texture -----	10	11
Good for sandwiches, lunches ---	9	16
Well baked, not doughy -----	7	3
Light, fluffy -----	6	3
Likes crust -----	3	5
Good for french toast -----	--	2
Habit - only kind ever used ----	--	2
Like it because it is sliced ---	--	2
Miscellaneous other reasons ----	19	13
Nothing liked -----	2	3
Not ascertained -----	16	11
Number of homemakers -----	255	262

^{1/} Percentages add to more than 100 because some homemakers gave more than 1 characteristic.

Table 31.--Characteristics disliked about regular white loaf bread, reported by homemakers who buy at grocery stores, delicatessens, or by home delivery

Characteristics disliked	Homemakers who buy at grocery stores, delicatessens, or by home delivery	
	1954	1955
	<u>Percent</u> ^{1/}	<u>Percent</u> ^{1/}
Doughy; gummy; soggy; not well baked -----	32	35
Too light; too full of air holes; texture not substantial; not good texture -----	18	15
Not good taste; flat taste; poor taste -----	13	18
Not fresh; gets stale too quickly; dries out; bread is dry -----	11	13
Dislike crust -----	--	7
Too soft -----	5	5
Too crumbly -----	--	2
Not nourishing; not much food value	4	--
It is fattening; too many calories -	3	4
Hard to digest -----	2	1
Not good for toast -----	--	1
Miscellaneous other reasons -----	23	13
Nothing disliked -----	26	32
Not ascertained -----	8	2
Number of homemakers -----	255	262

^{1/} Percentages add to more than 100 because some homemakers gave more than 1 characteristic.

Table 32.--Characteristics homemakers named in describing regular white loaf bread currently available; most important characteristics of good white loaf bread; and most disliked characteristics in white loaf bread

Characteristics of regular white loaf bread currently available			Most important characteristics of good white loaf bread			Most disliked characteristics in white loaf bread		
Description	1954	1955	Description	1954	1955	Description	1954	1955
	<u>Percent 1/</u>			<u>Percent 1/</u>			<u>Percent 1/</u>	
Keeps fresh -----	42	43	Keeps fresh -----	58	58	Doughy -----	68	58
Good for toast ----	31	31	Homemade taste --	48	49	Tasteless; flat taste -----	62	59
Soft -----	16	14	Nourishing -----	34	35	Not well baked --	52	48
Doughy -----	16	<u>2/</u>	Good for toast --	34	26	Gummy -----	49	36
Good taste -----	15	19	Good taste -----	30	28	Gets stale too quickly -----	49	49
Tasteless; flat taste -----	15	<u>2/</u>	Fine texture ----	26	23	Not easily digested -----	27	29
Fine texture -----	13	18	Light -----	26	25	Not good for toast -----	25	22
Moist -----	11	<u>2/</u>	Easily digested -	25	28	Dry -----	20	28
Filling; satisfies hunger -----	10	16	Enriched -----	23	10	Not nourishing enough -----	19	20
Enriched -----	10	<u>2/</u>	Filling -----	19	22	Not filling enough -----	14	16
Sliced -----	10	12	Moist -----	18	15	Dark brown crust	12	16
Light -----	<u>2/</u>	13	Soft -----	17	18	Thick crust -----	11	15
Nourishing -----	<u>2/</u>	12	Sliced -----	15	11	Not rich enough -	11	<u>2/</u>
			Light brown crust	14	12	Too refined -----	10	10
			Firm; compact ---	13	18	Thick slices ----	<u>2/</u>	13
			Sweet flavor ----	12	18			
			Well baked -----	12	14			
			Rich -----	12	11			
			Fluffy -----	10	10			
			Thin crust -----	<u>2/</u>	11			
			Thin slices -----	<u>2/</u>	11			
Number of homemakers -----	293 <u>3/</u>			293 <u>3/</u>			293 <u>3/</u>	

1/ Percentages add to more than 100 because homemakers were asked to name more than 1 characteristic.

2/ Less than 10 percent mentioned.

3/ Number of homemakers less than 300 because 7 who used only specialty white loaf bread were not asked these questions.

Table 33.--Proportions of homemakers baking and not baking bread

Baking habits	All homemakers	
	1954	1955
	<u>Percent</u>	<u>Percent</u>
Bake bread -----	53	64
Do not bake bread -----	47	35
Not ascertained -----	--	1
Total -----	100	100
Number of homemakers -----	300	300

Table 34.--Frequency of bread baking among homemakers 1/

Frequency	Homemakers who baked bread	
	1954	1955
	<u>Percent</u>	<u>Percent</u>
Once a week or more -----	31	40
Less than once a week -----	68	58
Not ascertained -----	1	2
Total -----	100	100
Number of homemakers -----	158	195

1/ Bread baking included loaf bread, rolls, biscuits, muffins, and cornbread.

Table 35.--Incidence of bread baking among homemakers, by family income

Incidence	Family income					
	Low		Middle		High	
	1954 <u>1/</u>	1955 <u>2/</u>	1954 <u>1/</u>	1955 <u>2/</u>	1954 <u>1/</u>	1955 <u>2/</u>
	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
Bakes -----	47	58	55	70	55	68
Does not bake -----	53	42	45	28	45	32
Not ascertained -----	--	--	--	2	--	--
Total -----	100	100	100	100	100	100
Number of home-makers -----	89	93	93	83	91	87

1/ See table 9 for tercile ranges.

2/ See table 10 for tercile ranges.

Table 36.--Frequency of baking bread among homemakers, by family income

Frequency	Family income					
	Low		Middle		High	
	1954 <u>1/</u>	1955 <u>2/</u>	1954 <u>1/</u>	1955 <u>2/</u>	1954 <u>1/</u>	1955 <u>2/</u>
	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
Once a week or more ----	33	44	29	38	30	37
Less than once a week --	64	54	71	59	68	63
Not ascertained -----	3	2	--	3	2	--
Total -----	100	100	100	100	100	100
Number of home-makers -----	42	54	51	60	50	59

1/ See table 9 for tercile ranges.

2/ See table 10 for tercile ranges.

Table 37.--Incidence of bread baking among homemakers, by education of homemaker

Incidence	Education of homemaker					
	None or grammar school		High school		College	
	1954	1955	1954	1955	1954	1955
	Percent	Percent	Percent	Percent	Percent	Percent
Bakes -----	52	62	51	63	60	72
Does not bake -----	48	37	49	37	40	28
Not ascertained -----	--	1	--	--	--	--
Total -----	100	100	100	100	100	100
Number of home-makers -----	79	76	167	169	53	43

Table 38.--Frequency of bread baking among homemakers, by education of homemaker

Frequency	Education of homemaker					
	None or grammar school		High school		College	
	1954	1955	1954	1955	1954	1955
	Percent	Percent	Percent	Percent	Percent	Percent
Once a week or more -----	22	38	32	42	41	29
Less than once a week ---	78	58	68	57	59	71
Not ascertained -----	--	4	--	1	--	--
Total -----	100	100	100	100	100	100
Number of home-makers -----	41	47	85	108	32	31

Table 39.--Incidence of bread baking among homemakers, by number of members in household

Incidence	Number of members in household					
	1 or 2		3 or 4		5 or more	
	1954	1955	1954	1955	1954	1955
	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
Bakes -----	46	51	53	66	63	79
Does not bake -----	54	47	47	34	37	21
Not ascertained -----	--	2	--	--	--	--
Total -----	100	100	100	100	100	100
Number of home-makers -----	101	94	131	134	68	72

Table 40.--Frequency of bread baking among homemakers, by number of members in household

Frequency	Number of members in household					
	1 or 2		3 or 4		5 or more	
	1954	1955	1954	1955	1954	1955
	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
Once a week or more -	24	29	29	43	50	46
Less than once a week -----	76	67	71	56	50	54
Not ascertained -----	--	4	--	1	--	--
Total -----	100	100	100	100	100	100
Number of home-makers -----	46	49	69	89	38	57

Table 41.--Changes in amount of white loaf bread used as compared with year prior to interviewing

Changes	Homemakers using white loaf bread	
	1954	1955
	<u>Percent</u>	<u>Percent</u>
More -----	24	27
Less -----	13	16
Same -----	62	57
Not ascertained -----	1	--
Total -----	100	100
Number of homemakers -----	290	289

Table 42.--Reasons reported by homemakers for using more white loaf bread during year of interviewing than in prior year

Reasons	Homemakers using more white loaf bread	
	1954	1955
	<u>Percent</u> <u>1/</u>	<u>Percent</u> <u>1/</u>
Present family members eating more (children older), family eating more snacks -----	65	65
Have to pack lunches, or more lunches -----	21	33
Increase in family size or in number of people eating meals -----	17	15
Miscellaneous other reasons -----	15	6
Not ascertained -----	1	1
Number of homemakers -----	71	78

1/ Percentages add to more than 100 because some homemakers gave more than 1 reason.

Table 43.--Reasons reported by homemakers for using less white loaf bread during year of interviewing than in prior year

Reasons	Homemakers using less white loaf bread	
	1954	1955
Decrease in family size or in number of people eating meals -----	<u>Percent</u> $\frac{1}{/}$ 26	<u>Percent</u> $\frac{1}{/}$ 29
Using more whole wheat bread, rye or other dark breads -----	24	13
Reducing, on a diet -----	18	24
No longer pack lunches or fewer lunches; eat less at home -----	18	20
Baking more -----	8	--
Family members eat less bread -----	5	11
Miscellaneous other reasons -----	13	11
Number of homemakers -----	38	45

$\frac{1}{/}$ Percentages add to more than 100 because some homemakers gave more than 1 reason.

Table 44.--Kinds of bread homemakers reported using instead of white loaf bread

Kinds of bread	Homemakers using less white loaf bread	
	1954	1955
Whole wheat -----	<u>Percent</u> $\frac{1}{/}$ 16	<u>Percent</u> $\frac{1}{/}$ 20
Dark bread -----	13	7
Rye -----	11	16
"Lite" diet bread -----	--	7
Miscellaneous other breads -----	21	13
No bread used as a substitute -----	29	60
Not ascertained -----	24	--
Number of homemakers -----	38	45

$\frac{1}{/}$ Percentages add to more than 100 because some homemakers used more than 1 kind of bread.

Table 45.--Changes in amount of all bread used compared with year prior to interviewing

Changes	All homemakers	
	1954	1955
	<u>Percent</u>	<u>Percent</u>
More -----	24	29
Less -----	10	13
Same -----	66	56
Not ascertained -----	--	2
Total -----	100	100
Number of homemakers -----	300	300

Table 46.--Reasons reported by homemakers for using more bread during year of interviewing than in prior year

Reasons	Homemakers using more bread	
	1954	1955
	<u>Percent</u> ^{1/}	<u>Percent</u> ^{1/}
Present family members eating more (children older), family eating more snacks -----	66	60
Have to pack lunches or more lunches -----	21	28
Increase in family size or in number of people eating meals -----	17	20
Miscellaneous other reasons -----	15	10
Not ascertained -----	--	3
Number of homemakers -----	71	86

^{1/} Percentages add to more than 100 because some homemakers gave more than 1 reason.

Table 47.--Reasons reported by homemakers for using less bread during year of interviewing than in prior year

Reasons	Homemakers using less bread	
	1954	1955
	<u>Percent</u> ^{1/}	<u>Percent</u> ^{1/}
Decrease in family size or in number of people eating meals -----	40	33
No longer pack lunches, pack fewer lunches, eat less at home -----	17	23
Reducing, on a diet -----	17	27
Baking less -----	13	--
Family members eat less bread -----	3	13
Miscellaneous other reasons -----	17	10
Not ascertained -----	3	--
Number of homemakers -----	30	40

^{1/} Percentages add to more than 100 because some homemakers gave more than 1 reason.

Checklist Used in Obtaining Homemakers' Description of
Bakers' White Pan Bread Available in Groceries

"Now, would you read down this list and tell me those things that you think describe the regular kind of white loaf bread being sold in grocery stores these days."

Keeps fresh	Rich
Gets stale too quickly	Not rich enough
Sweet flavor	Very white flour
Homemade taste	
Good taste	Enriched
Tasteless; flat taste	
	Nourishing
Soft	Not nourishing enough
Moist	
Light	Easily digested
Fluffy	Not easily digested
Doughy	
Gummy	Thin crust
Dry	Thick crust
Not well baked	Light brown crust
Firm; compact	Dark brown crust
Fine texture	
Too refined; not enough roughage	Sliced
	Thin slices
	Thick slices
Filling; satisfies hunger	
Not filling enough; doesn't satisfy hunger	Good for toast
	Not good for toast

Baking Procedure and Formulas for Breads
Used in Preference Tests - Experiment I ^{4/}

The equipment used to prepare the bread was of the type generally used for commercial bread production, but was especially designed for a pilot bakery. This permitted doughs of the relatively small size required to be given treatment similar to that employed in commercial practice.

Sponges and doughs were mixed in a horizontal mixer. The fermentation room was maintained at 82° F. and 85 percent relative humidity. Doughs were divided in a one-pocket divider, after which they were rounded in a rounder and proofed in an automatic overhead proofer. Sheetting and molding were done on a molder of conventional type. For pan proofing, a proof cabinet was maintained at 100° F. and 86 percent relative humidity. Bread was proofed to height in the pans, after which it was baked in an oven at 450° F.

It will be observed that, in order to meet the requirements of the different breads, some variation in formulas and procedures were adopted. In formulas Nos. 18, 21, and 25, it was necessary to increase the proportion of water because of the use of dry milk solids. To obtain bread of the low specific volume required in formulas Nos. 7, 13, and 21, the sponge fermentation time, floor time, and dough mixing time were shorter than for formulas Nos. 18 and 25. Formulas Nos. 7, 13, and 21 use less yeast and yeast food than formulas Nos. 18 and 25. Also, bread of formulas Nos. 7, 13, and 21 was given 2 minutes less time in the oven. The formulas and processes are described in the tabulation on page 50.

^{4/} By American Institute of Baking, Chicago, Ill.

Bread Formula	Bread No. 7	Bread No. 13	Bread No. 18	Bread No. 21	Bread No. 25
Sponge					
Flour <u>1</u> /	50%	50%	70%	50%	70%
Water	30	30	42	30	42
Yeast	1.75	1.75	2	1.75	2
Yeast food	.5	.5	1	.5	1
Diastatic malt flour, 20° L.	.5	.5	.5	.5	.5
Mix <u>2</u> /	2-2	2-2	2-2	2-2	2-2
Sponge time	2.5 hr.	2.5 hr.	4 hr.	2.5 hr.	4 hr.
Dough					
Flour	50%	50%	30%	50%	30%
Water	28	28	22	34	22
Salt	2	2	2	2	2
Sugar, sucrose	7	2	2	7	7
Nonfat dry milk solids	0	0	8	8	8
Lard	1	5	5	5	5
Yeast	0	0	0.5	0	0.5
Mix <u>2</u> /	2-6	2-6	2-7	2-6	2-7
Floor time	20 min.	20 min.	30 min.	20 min.	30 min.
Dough scaled	22.5 oz.	22.5 oz.	18.5 oz.	22.5 oz.	18.5 oz.
Intermediate proof	12 min.	12 min.	12 min.	12 min.	12 min.
Baked	25 min.	25 min.	27 min.	25 min.	27 min.

1/ The total flour in sponge and dough is 100 percent. Percentages of all other ingredients are based on the total flour. For example, 2 percent salt means that 2 pounds of salt are used per 100 pounds of flour. For formulas Nos. 7, 13, and 21, a total of 100 pounds of flour was used; 75 pounds of flour was used for Nos. 18 and 25. In order to mix doughs of this size it was necessary to divide each sponge in half and prepare the doughs in two batches.

2/ The first figure is the number of minutes at low speed, the second figure is the number of minutes at high speed.

Specific volumes, cubic inches per ounce,
for each white pan bread, by week of testing

Week	Bread No. 7		Bread No. 13		Bread No. 18		Bread No. 21		Bread No. 25	
	Range	Avg.	Range	Avg.	Range	Avg.	Range	Avg.	Range	Avg.
1	6.5-7.5	6.9	6.4-7.3	6.8	9.2-10.2	9.7	6.7-7.1	6.9	9.0-10.5	9.6
2	6.3-7.1	6.8	6.5-7.2	6.9	9.6-10.3	10.0	6.9-7.7	7.2	9.9-10.6	10.1
3	6.7-7.2	7.0	6.4-7.8	7.2	9.7-10.9	10.2	6.6-7.4	7.1	9.3-10.9	10.0
4	7.0-7.6	7.2	7.1-7.8	7.4	9.7-11.0	10.3	7.0-7.5	7.3	9.7-10.6	10.1
5	6.7-7.3	7.0	6.8-7.7	7.1	9.7-10.7	10.2	7.2-8.0	7.6	9.2-10.3	9.7
6	6.6-7.2	6.9	6.8-7.5	7.2	9.3-10.2	9.7	7.0-7.5	7.2	9.2-9.7	9.5
Average		7.0		7.1		10.0		7.2		9.9

Each loaf gave 19 slices including heels.

	Average weight per loaf, grams	Average weight per slice including heels, grams
Formulas Nos. 7, 13, 21	570	30
Formulas Nos. 18 and 25	455	24

Baking Procedure and Formulas - Experiment II

The equipment used to prepare the bread was of the type described for experiment I. The process was the same except that humidity in the proof cabinet was 85 percent, instead of 86 as in experiment I, and baking was at 440° F. instead of 450°. The formulas and processes are shown in the following tabulation

Bread Formula	Bread No.1	Bread No.2	Bread No.3	Bread No.4	Bread No.5
Sponge (all sponges were the same in formula and treatment)					
Flour <u>1</u> /	70%				
Water	42				
Yeast	2				
Yeast food	0.625				
Mix <u>2</u> /	2-2				
Sponge time	4 hr.				
Sponge temper- ature	76°F.				

Immediately after mixing, the sponges were divided into two equal parts which were fermented separately. This was necessary to remain within the capacity of the mixer at the dough stage.

Dough

Flour <u>1</u> /	30%	30%	30%	30%	30%
Water <u>3</u> /	23	20.5	18	23	20.5
Salt	2	2	2	2	2
Sugar, sucrose	7	7	7	7	7
Nonfat milk solids	8	4	0	8	4
Lard	5	3	3	3	5
Yeast	0.5	0.5	0.5	0.5	0.5
Mix <u>4</u> /	2-12				
Dough temper- ature	80°-82°F.				
Floor time	30 min.	30 min.	20 min.	30 min.	30 min.
Dough scaled	18.5oz.				
Intermediate proof	12 min.				
Baking temperature	440°F.				
Baking time	25 min.				

1/ The total flour in sponge and dough is 100 percent. Percentages of all other ingredients are based on the total flour. For example, 2 percent salt means that 2 pounds of salt were used per 100 pounds of flour.

2/ The first figure is the time in minutes at low speed, 40 r.p.m. The second is the time in minutes at high speed, 95 r.p.m.

3/ It was necessary to vary the amount of water used (i.e., vary the absorption) when the milk solids content was varied. Where no milk was used (formula No. 3) the absorption was lowest. In this formula it was also necessary to reduce the floor time from 30 minutes to 20 minutes.

4/ The first figure is the time in minutes at low speed, 40 r.p.m. The second is the time in minutes at high speed, 95 r.p.m. Procedures for all doughs were the same except for floor time.

Specific volume of breads, cubic inches per ounce

Week	Formula 1		Formula 2		Formula 3		Formula 4		Formula 5	
	Range	Avg.	Range	Avg.	Range	Avg.	Range	Avg.	Range	Avg.
1	9.7-10.2	10.0	9.4-10.3	9.9	9.5-10.8	9.9	9.7-10.6	10.1	9.7-10.6	10.2
2	9.7-10.2	10.0	9.4-10.3	9.9	9.8-10.1	9.9	10.0-10.5	10.2	9.9-10.5	10.2
3	9.5-10.7	10.1	9.3-10.8	10.1	9.5-10.3	10.0	9.6-10.2	9.9	9.6-10.2	10.0
4	9.5-10.2	9.8	9.4-9.9	9.7	9.4-10.6	10.0	9.2-10.0	9.7	9.3-10.0	9.6
5	9.4-9.8	9.6	9.3-10.2	9.8	9.4-10.5	9.8	9.3-10.0	9.6	9.6-10.1	9.9
6	9.7-10.6	10.2	9.3-9.7	9.5	9.3-9.9	9.7	9.3-9.9	9.6	9.3-10.0	9.6
Average		10.0		9.8		9.9		9.9		9.9

Each loaf gave 19 slices including heels.

Average weight per loaf was 452 grams.

Average weight per slice including heels was 23.8 grams.

